Reflections on the action of the New model Wave equation in Physical Systems.

We begin with the familiar & classically used $E-M$ wave equation,

i.e. derived through Maxwell's Laws.

$$1. \quad \nabla^2 \psi = \frac{1}{c^2}\frac{d^2\psi}{dt^2}$$

The Physical model variant equation is equivalent

$$2. \quad [\, \psi - dot \;=\; \gamma\,.\; \psi - dd \,]_s$$

$$as\ [\nabla \sim c\ \approx k\ \&\ k^2 = \frac{1}{\gamma} = f\ \approx \frac{d}{dt} \sim -dot\ 'Operator']$$

Dot notation is used where $[-dot]$ *signifies a 1st order time differential* $\left[\frac{d}{dt}\right]$ *& thus* $[-dd]$ *is 2nd order,* $\left[\frac{d^2}{dt^2}\right]$ *etc*

Psi is the both the operand parameter [ψ] & in [ψ]s guise can express an equation of state, where subscript s indicates a system.

Plus we take a step further to include *System Omega, nominally* $[\omega] = \left[\frac{k}{m}\right\}$, **i.e.**

$$3. \quad [\ \left\{\pm\right\} \psi - dot \leftrightarrow \equiv \leftrightarrow \left\{\frac{\gamma}{\omega}\right\}.\ \psi - dd\ ]_s$$

we read this dual identity such that,

$\{+\}$ *'maps to' gamma,* & $\{-ve\}$ *'maps to' omega.*

i.e. incorporating the model view that

$$4. \quad \omega \;\equiv -ve\ [\gamma]$$

and we infer that for physical systems the system Omega & Gamma operate as

complimentary mutuals to offset, compensate & or equillibriate, the dynamic action of the system.

There are [2] routes {+ve /-ve} & <u>both</u> are taken *contemporaneously leading to a 'null' result, i.e. Net gamma-forces equal zero, such that balance or equilibria can be achieved, & yet of course we perceive everyday phenomena through dynamic effects*. This is a rationale to explore 7 explain the 2-slit experiment.

The [γ] & [-veγ ≡ ω] 'appear' as counter-points but are likely a Ying-Yang phenomenon of one underlying *force*.

Further we imply that Psi can be any sensible or classical parameter such as mass, length, time, etc.

Example [ψ] = {m} We derive

$$\left\{\pm\right\} m - dot \;=\; \left\{\frac{\gamma}{\omega}\right\}.\ m - dd$$

The +ve output gives 'energy' $= [\ gamma\ x\ \ lambda\ ]$

$$Classically \qquad \frac{dm}{dt} \equiv E = F.d \equiv \gamma.\lambda$$

$$\&\quad m - dd = \frac{d^2[m]}{dt^2} \equiv \lambda = \frac{m}{p}\ \ model\ De\ Broglie\ \&\ Heisenberg.$$

Note also in this model gamma has a dual identity such that '<u>time is seen as a force</u>' { t } = [γ] = { F }

& {-ve} is seen as a phase Operator incurring a clockwise rotation by ½ cycle, thus –ve gamma = [γ – 180] deg = ω

The –ve output yields the 'restorative' –ve gamma, or System Omega.

$$-ve\; m - dot \;=\; \omega\,.m - dd$$

$$Thus \quad -ve\; m - dot = \frac{k}{m}.lambda$$

$where\ we\ introduce\ one\ variant\ on\ omega,\ \ \omega m\lambda = 1\ or\ \omega = k/m$

$as\ system\ wave\ number\ [k] = reciprocal\ lambda\ \frac{1}{\lambda},$ $[k.\lambda] = 1 \sim [2\pi]^*$

$$often\ seen\ as\ [k = \frac{2\pi}{\lambda}], \quad \&\ [2\pi]^* = 1\ full\ rotation, \quad in\ general\ can\ be\ either\ \frac{+}{-} sense$$

$Thus\ we\ get\ a\ model\ standard$ **5.** $-ve[m.m - dot] = Unity$

$$this\ also\ a\ gamma\ variant\ such\ that\ system\ [F] \frac{\&}{or} \{t\}\ gives\ identically\ [\gamma] = -ve[m.m]$$

$Then\ as\ omega = -ve\ gamma\ we\ get\ \omega = -ve.-ve[m.m]$

$These\ are\ not\ conventional - ve\ signs, \quad i.e.\ `they\ do\ not\ cancel'$

$but\ would\ indicate\ 2\ x\ ½\ cycle\ [c.w.]\ rotations, in\ tandem, or\ phase\ summation$

$reference\ any\ or\ both\ masses\ [\,m.m\,]\ here.$

$N.2.L\ \&\ specifically\ the\ U.L.G. can\ be\ seen\ in\ new\ light\ reference\ the\ wave\ equation\ principally,$

$\&\ secondly\ the\ opposing\ gamma\ omega$ mutuality $relationship, which\ has\ resonance\ with\ N.3.l$

We say System Gamma as $\mathbf{F} = \frac{\mathbf{GMm}}{\mathbf{r^2}}$ ***is a wave equation*! Frozen out in Classically familiar form**

featuring mass as Psi, as outlined previously.

This can be derived easily from any of the introductory w.eqn's,

with [G] ≡ the k-number, [r] ≡ lambda.

& note $[\gamma] = [\lambda^2] \sim r^2 \quad \sim [F]\ \&\ \{t\}\ from\ previous,$

$$\&\ frequency\ [f] = \frac{1}{t} = \frac{1}{\gamma} \sim \frac{d}{dt} \approx -dot\ operator$$

also we use $\mathbf{mass}$ **in the binary sense, mass** $[\mathrm{m}] \equiv [\mathrm{Mm}]$.

Then –ve mass = Reaction, we call that model gravity or acceleration.

$-vem = \left[\frac{m}{\gamma^4}\right] = [k^3] = \left[\frac{k}{\gamma}\right] = k - dot = a \equiv [h]\ Planck\ in\ U.L.G. applied\ to\ our\ local\ binary\ scheme.$

$These\ steps\ illustrate\ this\ model\ is\ scale\ invariant, \&\ massey -$
$wavey\ mutuality\ or\ `quantum\ gravity'\ is\ observed\ locally.$

In effect there are No Universal constants just system numbers defined by $[\lambda]^n\ \ n\ \frac{+}{-} integers$

$$If\ we\ allow\ [\psi] = [p]\ momentum\ into\ the\ wave\ eqn\ we\ get\ \frac{dp}{dt} = [\gamma]\ gamma$$

$$as\ \ \{t \equiv \gamma\}\ \ then\ \ [p] = [\gamma^2] = [\lambda^4], \qquad \&\ \ as\, mass = \lambda^5\ \ we\ get\ \ p = \frac{m}{\lambda} = mk,$$

$$or\ gamma\ [\gamma] = [m.k] - dot$$

$$from\, previous\, conservation\, of\, momentum.$$

$$Then\, we\, have\, [2]\, states\, for\ +ve\, gamma$$

6. $$\gamma = [\,\{m - dot\,.\,k\} \leftrightarrow (+) \leftrightarrow \{m\,.\,k - dot\}\,]$$

$$m - dot = energy, \quad \&\ \ k - dot = accelleration$$

Thus classical force $F = E/d\ \&\ ma$ *1/d = 1/λ ≡ [k]*

Allowing the model view of N.3.L or a Mach nuance for '$action\ begets\ reaction$*' we see N2L as the* $action\ reaction\ principle$ *in the product [m.-vem] ≡* ma *. This allows us to view the U.L.G. in terms of*

A new gamma-force expression γ = [m.-vem] = m.h

Gamma [γ] = Mm.h 'binary-system'

$$Where\ we\ also\ note\ [a] = \frac{1}{lambda^3} \sim \frac{1}{[10^{11}]^3} = 10^{-33} \sim [h]$$

$$also\ \ local\ acc - gravity \sim [h] = [k^3] = [k] - dot \sim \frac{dk}{dt} \equiv \frac{dG}{dt}$$

$$local\ Gamma\ gives\ [Mm].h \sim [\,10^{30}.\ 10^{25}\,.\ 10^{-33}\,] = 10^{22}$$

Which is a good estimate for U.L.G. Force magnitude.

$$\&\ \ gamma \approx Area\ [A] = \lambda^2$$

A literal model [γ] based interpretation of Kepler, K.2.L Area ≡ time.

This same approach will also yield the famous $E = mc^2$

for [ψ = m] , [c = k], which will prove '<u>Action</u> as mass' i.e. $E.t = m$ *& model Einstein* $m = \gamma.m - dot.$

& [ψ] = negative energy ≡ -ve m-dot gives,

-ve λ = [ω.k] = [K] Hooke

Thus we see a negative lambda (De Broglie) emerges from the –ve energy Psi, plus a complimentary Hooke constant derived anew from this enriched force law. The variant parameters are cyclic & iterative reinforcing & restorative, melding & moulding, thro dynamik morphik states.

In short we have found a key here, to the emergence of Beauty & Order in Nature, balance! self regulating, self sustaining & timeless.

We say timeless from our bothwise {t} Arrow Hypothesis, the new Law removes the need for fictitious forces, as ad-hoc hypotheses, we now have $-ve\ gamma \equiv system\ Omega,\ Thus\ we\ gain\ the\ balanced\ forces\ we\ always\ yearn\ for,$ *& because the new General Law yields a system in equilibrium i.e Net Forces = zero, ← means → Net time = zero.*

Now that's going to keep the Philosophers very busy.

The broad sweep statement could start something like ' The Universe has always existed !, the new law seems to support severally

' thus will always exist!... meandering thro, Net time = zero means time is in essence conserved & thus conventional notions of time elapsing are illusory,'... etc, etc. This will forge a new view of the Atomik state/s & What prospects now for the Big Bang as Genesis?

There is further bounty in embracing N.3.L. & Mach.

Whereas in binary schemes we rather conventionally accept the gravity force as conservative with a 'negative sign &/or centric acting', we also see centripetal force as the outrider to offset or stop orbiting bodies [m] crashing towards [M].

We saw that model +ve gamma gave [2] states, where $[m - dot].k$ could be mv^2/r, centripetal F & $m.[k - dot]$ $can\ be$ $[m. -vem]$ or – $[mm]\ =\ ma$ works also to yield the opposing sign case.

This would seem historically to be all we really needed to explain order in the motions of the Heavens, in the 2-body case certainly.

However the model Omega offers further riches, & additionally [4] extra or complimentary states.

System Omega = -ve system Gamma

$\boldsymbol{\omega} = \boldsymbol{-ve\,\gamma} \equiv \boldsymbol{-ve[\,m.k] - dot}$, *gives*

$$7.\qquad \omega = [\ \{-ve\ m - dot\,.k\} \leftrightarrow (+) \leftrightarrow \{-vem\,.k - dot\} \leftrightarrow (+) \leftrightarrow \{m - dot\,.-vek\} \leftrightarrow (+) \leftrightarrow \{m\,.-ve\ k - dot\}\ ]$$

Thus if we say the System state [ψ]s = [γ + ω]s we get

[Ψ]s =

$$[\ \{m - dot\,.k\} \leftrightarrow (+) \leftrightarrow \{m\,.k - dot\}$$

$$\{ \leftrightarrow (+) \leftrightarrow -ve\ m - dot\,.k\} \leftrightarrow (+) \leftrightarrow \{-vem\,.k - dot\}$$

$$\leftrightarrow (+) \leftrightarrow \{m - dot\,.-vek\} \leftrightarrow (+) \leftrightarrow \{m\,.-ve\ k - dot\}\ ]$$

This is a heady mix going on, indicative of No unbalanced forces, necessary to maintain dynamic equilibrium.

$$\boldsymbol{System\ Net\ [F]s \equiv [\,\gamma \leftarrow (+) \rightarrow \omega\,]s \equiv 0}$$

Conclusion

The multi-state of [ψs]. must maintain balance w.r.t. these conditions reinforcing the Steady State 'status-quo' we generally observe at macro scale in 'classical' gravitationally bound binary scheme. See Fig:1 p.5

A more vigorous B.B type scenario is envisaged for the high magnitude entropy conditions of Atomic systems.

Therefore with respects we humbly offer up a New Physical model for a General & Natural 'Force law' in Nature.

$$8.\qquad [\ \left\{\frac{+}{-}\right\}\ \psi - dot \leftrightarrow\ = \leftrightarrow \left\{\frac{\gamma}{\omega}\right\}.\ \psi - dd\ ]s$$

Fig;1 System a New model Force Law showing System state [ψ]s to accommodate relative equilibrium for Physical systems represented here by Binary mass system {m} ~ [Mm].

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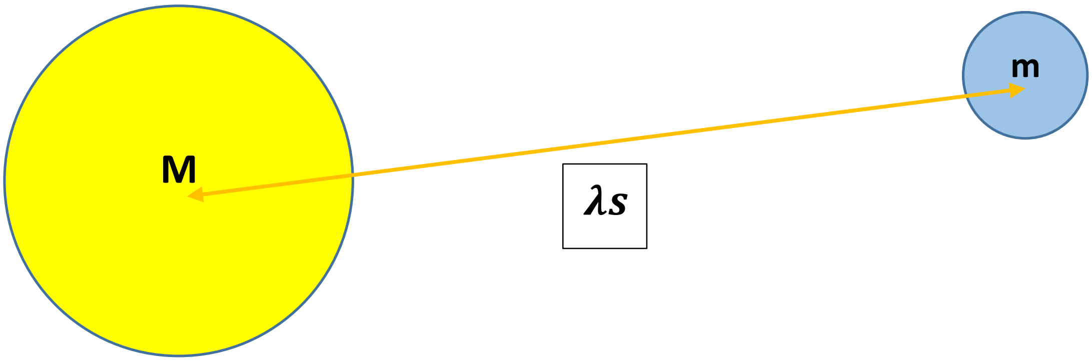
$$9.\ [\Psi]s = [\ \left\{\frac{E}{\lambda}\right\} (+) \{m.a\} (+) \left\{\frac{k}{m}\right\} (+) \{a^2\} (+) \{e.S\} (+) \left\{m.\frac{dS}{dt}\right\}\ ]$$



λs

$$[\Psi]s = [\{F\} (+) \{N2L\} (+) \left\{\frac{k}{m}\right\} (+) \{h^2\} (+) \left\{e.\frac{dK}{dt}\right\} (+) \left\{m.\frac{dS}{dt}\right\}]$$

$$[\Psi]s = [\{Newton\} (+) \{Omega\ \&\ Mach\}$$

$$(+) \{Planck\ \&\ Dirac, Heisenberg, Schrodinger\ \&\ De\ Broglie\}$$

$$(+) \{e.\ Hooke\ [K]\} (+) \{m.\ Einstein\ [\Lambda]\}\ ]$$

$We\ could\ also\ insert\ Galileo, Copernicus, Kepler, Huygens, Boyle, Coulomb, Maxwell, Lorentz, Bohr, \&\ multiple\ other\ luminaries.$

Setting [Psi] To other parameters & stated findings Using simplest +ve case formulation alone,

$\psi - dot = \gamma.\psi - dd$, **we get**

[Ψ] = {t} ~$[\gamma]$ results 1 = f.t

[Ψ] = {ω} -ve [m.m]-dot = 1

[Ψ] = { I } = {m.γ} $m = \gamma.e$ **model Einstein from [Psi = I] = *Moment of Inertia***

[ψ] = [S] entropy & [S = B = $k^9 = K - dot$ **] get, S-dot =** $\gamma.S - dd\ or$ **E = kS = kB ~ E = cB**

Scrodinger ψ[ih-bar]-dot = H{ψ}= E

Let Psi = Unity, gives [i-dot] .h-bar (+) i. [h-bar]-dot & i = [p], h-bar = [h/2pi] = -vem . p

Ignore factor **[2]** thus, **γ. -vem.p (+) p . –vem-dot .p**

as $\omega = -ve\ \gamma$ we get **ω. m.p (+)** p^2 **. 1/m**

$\omega.p = f\ \&\ p^2$ **= -1 m-dot {+} - ve1/m, these are equality states thus,** $[m.m - dot] = -ve\ 1$

Dirac $m\{\psi\} = i.\gamma.\frac{d\{\psi\}}{dx}$ **, let Psi = 1, & d/dx = [k] then m = i.γ.k = pγk =** γ^3**.k thus m = k/ω or** $\omega = \frac{k}{m}$

The impetus for this exploration was an intuition ' $Platonik\ space'$ perceived by the Author in a moment of reflection on 'quantum-gravity',… 'what does it mean?' …then a midnight Eureka moment resulting in the identity I call the Veritas.

$$10. \qquad h - dd.\lambda \;=\; h.\lambda - dd$$

This was quickly expanded to a triplet where it was assumed an Omega existed such that the dual arrows indicate flow.

$$11. \qquad h - dd.\lambda \;\leftrightarrow\; h - dot.\lambda - dot \;\leftrightarrow\; h.\lambda - dd$$

I struggled with this for a considerable amount of time, unwittingly 'equally blessed & cursed' by the fact that I stumbled upon the real deal, & thus lost a lot of time chasing some unknown master equation. Excitement, Frustrations & dead ends were multiple, and all I really knew!... was I would never give up.

Eventually I found by accident rather than design this was not an identity 'under-action' of some hidden omega operator.

It was the Omega!, somewhat extended, such that the [3] expressions above are all equivalent 7 all are Omega [ω].

I found the classical wave equation as employed in the main body of this work, early on, but didn't realise its full signifigance, so moved on. Luckily I came back to it after re-inventing some wheels + an insight that led to themore fruitful introduction of the complex unity wheel.

So we state some results.

Pairing up any two of the expressions we can derive several variant wave equations such that these [2]

$$h - dot \;=\; \gamma.\ h - dd$$

$$\lambda - dot \;=\; \gamma.\ \lambda - dd$$

Can be combined in product to make this one, which is essentially the middle term from [11.]above.

$$12. \quad h - dot, \lambda - dot \;=\; \gamma.\ h - dd\ .\ \gamma.\ \lambda - dd$$

This is also a wave equation i.e.

$$h - dot, \lambda - dot \;=\; \gamma.\ [h.\lambda] - ddd$$

$$\omega \;=\; \gamma\ .\ \omega[h\lambda]$$

$$=\; \pi.[h.\lambda]$$

which can be expanded to represent previous [3] expressions in 11.

In short we have an iterative model or nested wave equation, & indeed the wave equation itself is just a convenient useful expression of the underlying Platonik model at work in Nature.

We could use momentum of Inertia to find this, where [I] = [m.γ], and use tandem dot operators

Such that $I - dot \;=\; [m.\gamma]/\gamma$ *thus we get the familiar model Einstein, i.e.*

Cancel the gamma's gives $mass\ [m]$, *leave them in we get* $\gamma.\frac{[m]}{\gamma} = \gamma.m - dot$, *thus an equality here **m =γ.m-dot**.*

This is essentially classical & quantum Action, or $energy\ x\ time \;=\; mass$,

often stated as a variant uncertainty principle.

But in the quantum we feel $[h] \;\equiv\; -ve\ mass$, *thus quantum U.P. must be*

$$-ve\ energy\ \ x\ \ gamma \;=\; -ve\ mass$$

& of course allowing a commutative –ve Operator we get $energy\ \ x\ \ -ve\ gamma \;=\; -ve\ mass$

But the model says –ve gamma = system Omega, thus we repeat the last step, energy x omega = -ve mass

Or in model parlance, ω.m-dot = k-dot, & classical spin $\omega.E \;=\; a$

'Omega operates on Energy gives gravity', …from the equivalence principle.

*One more –dot operator gives us the wave eqn **m-dot = γ. m-dd***

A model tale

'Up the back o the Monument!'

Fig.2: ***Magik-Moments***

$$\dot{I} = \gamma . \ddot{I}$$

$$-ve\ \dot{I} = \omega . \ddot{I}$$

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$$I - dot \;=\; \gamma . I - dd$$

$is\ a\ Source\ generic\ wave\ equation\ with\ [\psi] \equiv Moment\ of\ Inertia\ [I] = m.\gamma$

$Thus\ [m.\gamma] - dot \;=\; \gamma.[m.\gamma] - dd \;\; can\ yield$

$mass \;=\; \gamma.m - dot\ which\ is\ model\ [S.R]\ Einstein.$

Refer back to $I \;=\; mass\ x\ gamma$ this is equivalent to $\gamma^3.\lambda$, thus

$$m \;=\; \gamma^3.[\frac{\lambda}{\gamma}] \;=\; \gamma^3.k$$

& that is our model Omega variant expressed here as Dirac et al sans Psi {ψ}

Once again we refer to expanded version $[m.\gamma] - dot \;=\; \gamma.[m.\gamma] - dd$

& note $[m.\gamma] - dot \;=\; \lambda[m.\lambda] - dot$

$$t \quad hus \;\; [m.\lambda] - dot \;=\; k.\gamma.\lambda[m.\lambda] - dd$$

$$= \gamma.[m.\lambda] - dd \quad as\ [\lambda.k]\ cancel$$

$again\ we\ have\ a\ nested\ \ w.eqn\ now\ featuring\ momentum\ [p]$ i.e. in essence Newton's first Law

$$[p] = [m.\lambda] - dot \;= m - dot.\lambda\ (+)\ m.\lambda - dot \quad i.e.\ [p] = [e.\lambda]\ (+)\ [mk]$$

Thus N.2.L drops out when N.1.L. *is acted upon by a force*, [γ] ≡ { t}, i.e $dp/dt \;=\; [m.k] - dot$ [2] varieties here.

N.3.L is in effect –ve N.2.L , -$ve dp/dt \;=\; -ve[m.k] - dot$ = $Omega\ [\omega][4] varieties$, commonly seen as $F_{21} = -F_{12}$, etc.

$$Therefore\ we\ only\ need\ \; -ve[I] - dot \;=\; \omega.[I] - dd, \;\; yields\ \; -ve\ mass \;=\; gravity$$

Gamma = [m.k]-dot ~ $\left[\frac{m}{\lambda^3}\right] \sim \left[\frac{m}{V}\right]\ then\ \left[\frac{m}{V}\right] - dot \;= [\gamma - dot] = 1 \sim R.Boyle. \;\; or\ \left[\frac{m}{V}\right] - dot = \;\gamma.\left[\frac{m}{V}\right] - dd\ a\ la\ mode.$

$$also, \quad -ve\ Gamma \equiv \omega \quad or \quad -ve[\lambda.\lambda] \equiv -ve\lambda.\lambda \;=\; [K].\lambda$$

$$a\ \ w.eqn\ \&\ variant\ \ [h - dd.\lambda]\ \ \&\ \ on\ the\ elektrik\ apple\ eqn\ \ \omega.m,\gamma = \lambda$$

$[N.I.V.]$

Sin e, an Sceal, agus dun an doras mo buachaill.